Trend Study 16A-6-02

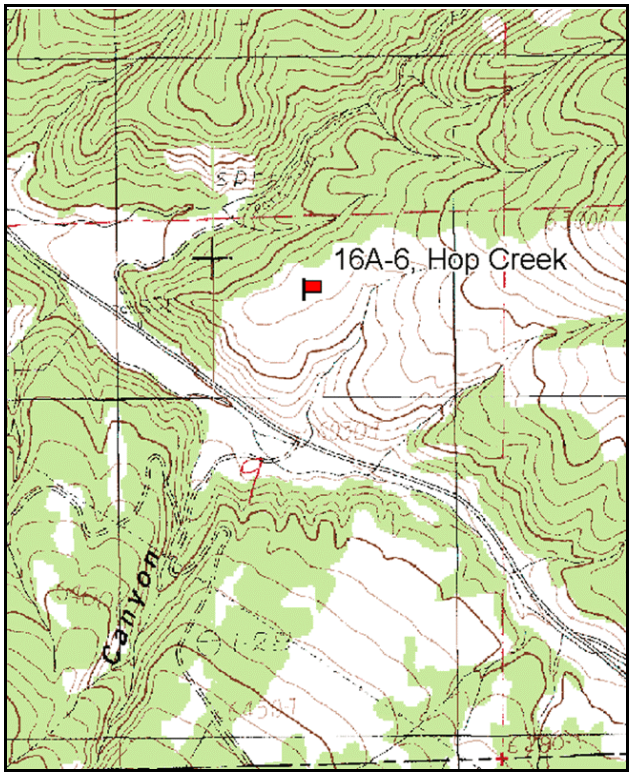
Study site name: Hop Creek Browse . Vegetation type: Antelope Bitterbrush .

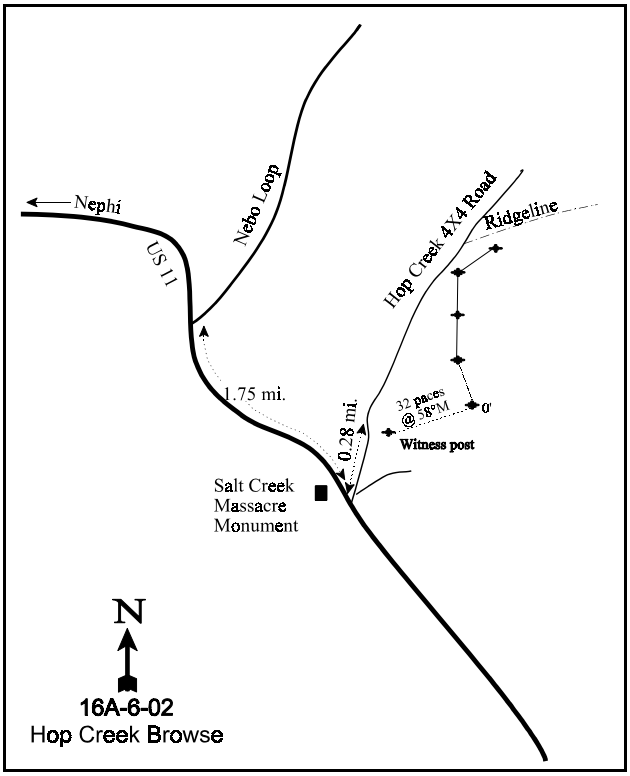
Compass bearing: frequency baseline 163 degrees magnetic (line 2-3 @ 1°M, line 4 @ 45°M).

Frequency belt placement: line 1(11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the intersection of Highway 132 and the Nebo Loop Road, proceed south on Highway 132 for 1.75 miles. Just past the Salt Creek Massacre Monument, stop at a turnoff on the north side of the road. Drive up the left fork of a four-wheel drive road 0.25 miles to a witness post. From the witness post walk 32 paces at 58°M to the 0-foot stake. The 0-foot baseline stake is located 2 paces to the east of an antelope bitterbrush plant with a browse tag, number E1318, attached. The study is marked by green steel "T" fenceposts approximately 12 to 18 inches in height.





Map Name: Fountain Green North

Diagrammatic Sketch

Township 13S , Range 2E , Section 9

GPS: NAD 27, UTM 12S 4395286 N 439550 E

DISCUSSION

Hop Creek Browse - Trend Study No. 16A-6

The Hop Creek Browse study is located adjacent to the Hop Creek bitterbrush browse transect which is found on a broad ridge top just north of Salt Creek Canyon. The area has a gentle slope (3% to 5%) that faces south to southeast at an elevation of 6,300 feet. Vegetative composition is dominated by a mixed stand of mountain big sagebrush and antelope bitterbrush in association with a moderately diverse and vigorous herbaceous understory. This area is an important wintering area for both deer and elk. Abundant evidence (pellet groups, antler drops, etc.) of big game was found in 1983. Quadrat frequency from 1997 indicated moderate amounts of both deer and elk pellet groups at 34% and 24% respectively. Data from a pellet group transect read along the study site baseline in 2002 estimate high deer use at 146 deer days use/acre (360 ddu/ha). Elk use was estimated at 23 days use/acre (56 edu/ha). A few cattle pats were also encountered. Most of the big game use appears to be from winter use.

Soil is alluvial, very rocky, and appears well drained. Parent material is sedimentary rock, principally limestone. Effective rooting depth is estimated at just over 20 inches. Soil texture is a clay loam with a neutral pH of 6.9. A caliche layer was found about 10 to 12 inches in depth. However, the abundance of deeper rooted bitterbrush would suggest that the layer is relatively permeable. Rocks and pavement are uncommon on the surface. There are localized areas of bare ground which show signs of some soil movement. However, protective ground cover appears to be sufficient to prevent most erosion and the erosion condition classification was determined as stable in 2002.

The browse composition consists chiefly of mountain big sagebrush which accounted for 66% of the browse cover in 1997 and 63% in 2002. The more preferred antelope bitterbrush occurs in much smaller numbers and is more heavily utilized. The sagebrush population numbered approximately 2,320 plants/acre in 1997, increasing to 3,120 plants/acre in 2002. Plants are relatively large and vigorous with low percent decadence and light to moderate use. Recruitment is good with 33% of the population consisting of young plants.

Bitterbrush had a population density of only 540 plants/acre in 1997 yet produced 22% of the browse cover. Its density was similar to the initial 1983 estimates (533 plants/acre). Density declined slightly in 2002 to 480 plants/acre. Bitterbrush on the site are large, erect, and vigorous. Use has typically been heavy with 100% of the plants sampled in 1983 displaying heavy use. In 1997, 70% of the bitterbrush were classified as heavily browsed increasing to 92% in 2002. Recruitment has been poor with no seedlings or young sampled prior to 1997 and few seedling or young sampled in 1997 or 2002. Annual leader growth was also poor in 2002 averaging about 1 inch.

The herbaceous understory is diverse and productive. Perennial grasses combined to produce just under 20% cover in 1997 and 17% in 2002. Kentucky bluegrass, Sandberg bluegrass, western wheatgrass, and bluebunch wheatgrass are dominant. Mutton bluegrass and needle-and-thread grass are also fairly common. Forbs are diverse yet not particularly abundant. Common perennial species include pacific aster, bastard toadflax, Indian paintbrush, tapertip hawksbeard, and blue flax.

1983 APPARENT TREND ASSESSMENT

Soils appear stable on the ridge top, but show signs of erosion where the slope becomes steeper. On this soil type, a dense and uniform ground cover is necessary to prevent erosion. Given the dry character of this site, a dense herbaceous understory may not be possible. Mountain big sagebrush appears to have a growing population while antelope bitterbrush is stable or even in a state of decline. Lack of reproduction may be the problem. Spring or early summer livestock grazing to reduce grass vigor might be an advisable management practice on this site.

1989 TREND ASSESSMENT

Soil trend is slightly up. There was an increase in basal vegetative cover detected, and a corresponding decrease in the percentage of bare soil. The stand of large and generally vigorous mountain big sagebrush shows a 17% decline in density. Fewer mature sagebrush were counted in 1989, while there was an increase in the percentage of decadence from 13% to 33%. Hedging is mostly light. The less common bitterbrush tends to be heavily hedged. There were fewer bitterbrush counted in 1989, and heavy use declined from 100% in 1983 to 50% in 1989. Vigor also improved dramatically. Trend for the herbaceous understory is stable. Nested frequency of western wheatgrass increased while nested frequency of bluebunch wheatgrass and Kentucky bluegrass declined. Fewer sego lily and toadflax were counted, otherwise composition is similar and the data show slight declines in total forb frequency in 1989.

TREND ASSESSMENT
soil - up slightly (4)
browse - stable (3)
herbaceous understory - stable (3)

1997 TREND ASSESSMENT

The soil trend is stable with similar amounts of bare ground encountered. Litter cover declined while sum of nested frequency of perennial herbaceous plants increased. Trend for browse is also stable. Density of big sagebrush has remained similar to 1989 estimates. Use is mostly light, vigor good, and percent decadence moderately low at only 13%. Bitterbrush also displays a stable trend. Density is similar to 1983 estimates and percent decadence has declined from a high of 33% in 1989 to only 7% currently. The shrubs are still heavily hedged with 70% of the bitterbrush sampled displaying a heavily hedged growth form. A few seedlings and young were encountered this year. Trend for the herbaceous understory is up with an increase in the sum of nested frequency for perennial grasses and forbs. Nested frequency of Kentucky bluegrass and bluebunch wheatgrass increased significantly while nested frequency of western wheatgrass declined. Nearly all of the perennial forbs encountered in 1989 show increased frequencies.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - up (5)

2002 TREND ASSESSMENT

Soil trend is stable with similar ground cover estimates compared to 1997. There is excellent protective ground cover and the erosion condition classification was considered as stable. Trend for browse is slightly improving for mountain big sagebrush but down slightly for bitterbrush. Mountain big sagebrush is the key browse species on this site since it accounts for 63% of the total browse cover. It has increased 26% in density since 1997 and age class analysis indicates an expanding population with 33% of the stand being young plants. Use remains light to moderate with generally good vigor and moderate amounts of decadence. Bitterbrush provides 16% of the total browse cover with a small population of 480 plants/acre. It is very heavily utilized and reproduction continues to be poor. Decadence has increased since 1997 from 7% to 29%. Continued increases in the density of mountain big sagebrush may come at the expense of bitterbrush. Overall the browse trend is considered slightly up. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses and forbs has slightly declined since 1997 but not enough to warrant a downward trend, especially in a drought year. Identification of some of the perennial grasses, mostly the *Poa's*, was difficult in 2002 due to late flowering.

TREND ASSESSMENT
soil - stable (3)
browse - slightly up (4)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 16A, Study no: 6

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
G	Agropyron smithii	$_{b}$194	$_{b}$205	$_{a}$123	$_{a}$131	75	73	45	54	1.57	3.15
G	Agropyron spicatum	$_{a}$135	$_{a}$92	$_{b}$173	$_{b}$171	53	33	59	60	5.03	5.05
G	Bromus tectorum (a)	-	-	65	82	-	-	24	33	.67	.84
G	Festuca ovina	-	-	1	3	-	-	1	1	.03	.03
G	Melica bulbosa	$_{ab}$15	$_{c}$36	$_{a}$9	$_{bc}$33	6	13	3	11	.21	1.22
G	Oryzopsis hymenoides	-	-	-	3	-	-	-	1	-	.15
G	Poa fendleriana	$_{ab}$50	$_{c}$94	$_{bc}$71	$_{a}$27	22	40	30	11	1.61	.88
G	Poa pratensis	$_{a}$74	$_{a}$50	$_{b}$172	$_{a}$80	23	15	55	28	7.65	2.23
G	Poa secunda	$_{a}$35	$_{ab}$39	$_{b}$84	$_{c}$115	16	22	31	44	2.47	2.80
G	Stipa comata	59	53	36	41	24	25	16	16	1.04	1.17
Total for Annual Grasses		0	0	65	82	0	0	24	33	0.67	0.83
Total for Perennial Grasses		562	569	669	604	219	221	240	226	19.64	16.70
Total for Grasses		562	569	734	686	219	221	264	259	20.32	17.54
F	Achillea millefolium	-	1	-	-	-	1	-	-	-	-
F	Agoseris glauca	$_{a}$-	$_{a}$-	$_{b}$22	$_{b}$33	-	-	9	17	.11	.35
F	Alyssum alyssoides (a)	-	-	$_{a}$120	$_{b}$162	-	-	42	59	.51	.83
F	Allium spp.	-	2	-	1	-	1	-	1	.00	.00
F	Antennaria rosea	1	7	5	7	1	2	2	3	.03	.04
F	Arabis spp.	-	-	1	-	-	-	1	-	.00	-
F	Aster chilensis	$_{a}$2	$_{ab}$13	$_{bc}$25	$_{c}$28	2	6	8	11	1.18	.90
F	Astragalus convallarius	$_{a}$23	$_{b}$55	$_{a}$9	$_{a}$7	10	25	5	5	.10	.02
F	Astragalus spp.	-	-	1	2	-	-	1	1	.03	.00
F	Castilleja linariaefolia	$_{ab}$4	$_{a}$-	$_{c}$31	$_{b}$8	2	-	14	6	.56	.08
F	Camelina microcarpa (a)	-	-	8	-	-	-	4	-	.02	-
F	Calochortus nuttallii	$_{b}$35	$_{a}$3	$_{a}$10	$_{b}$36	20	1	6	17	.03	.11
F	Chenopodium album (a)	-	-	-	3	-	-	-	1	-	.00
F	Chaenactis douglasii	-	-	2	-	-	-	2	-	.01	-
F	Chorispora tenella (a)	-	-	-	2	-	-	-	1	-	.15
F	Cirsium undulatum	3	3	18	16	2	3	8	9	.23	.33
F	Collomia linearis (a)	-	-	$_{b}$45	$_{a}$26	-	-	20	13	.12	.06
F	Conringia orientalis (a)	1	-	-	-	1	-	-	-	-	-
F	Comandra pallida	$_{b}$123	$_{a}$51	$_{b}$91	$_{a}$30	56	25	44	15	.91	.18
F	Collinsia parviflora (a)	-	-	171	183	-	-	62	60	1.26	2.20
F	Crepis acuminata	$_{a}$1	$_{a}$5	$_{b}$45	$_{b}$69	1	4	27	35	.48	1.25
F	Cymopterus longipes	$_{a}$-	$_{a}$6	$_{b}$50	$_{b}$42	-	3	26	20	.35	.49
F	Descurainia pinnata (a)	-	-	3	6	-	-	1	3	.00	.01
F	Draba spp. (a)	-	-	3	-	-	-	1	-	.00	-

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'83	'89	'97	'02	'83	'89	'97	'02	'97	'02
F	Epilobium brachycarpum (a)	-	-	38	24	-	-	15	12	.07	.08
F	Eriogonum racemosum	5	3	1	4	3	1	1	2	.00	.06
F	Eriogonum umbellatum	-	3	3	3	-	2	2	1	.06	.00
F	Erysimum spp.	-	-	1	-	-	-	1	-	.00	-
F	Galium spp.	-	-	-	1	-	-	-	1	-	.00
F	Lappula occidentalis (a)	-	-	-	2	-	-	-	1	-	.00
F	Lactuca serriola	-	4	3	-	-	3	1	-	.00	-
F	Linum lewisii	$_{a}$25	$_{a}$3	$_{b}$91	$_{a}$21	11	2	38	11	.62	.11
F	Lupinus argenteus	-	-	2	1	-	-	1	1	.38	.00
F	Machaeranthera canescens	-	-	-	1	-	-	-	1	-	.00
F	Microsteris gracilis (a)	-	-	$_{a}$8	$_{b}$39	-	-	3	17	.01	.11
F	Phlox longifolia	$_{a}$-	$_{b}$11	$_{c}$38	$_{c}$27	-	5	15	14	.07	.19
F	Polygonum douglasii (a)	-	-	3	4	-	-	2	2	.01	.01
F	Ranunculus testiculatus (a)	-	-	$_{b}$74	$_{a}$48	-	-	26	19	.52	.48
F	Sphaeralcea coccinea	-	7	3	1	-	2	1	1	.00	.00
F	Tragopogon dubius	13	10	16	15	7	4	10	7	.10	.13
F	Zigadenus paniculatus	$_{a}$5	$_{a}$-	$_{ab}$24	$_{b}$32	2	-	10	16	.22	.26
Total for Annual Forbs		1	0	473	499	1	0	176	188	2.55	3.96
Total for Perennial Forbs		240	187	492	385	117	90	233	195	5.57	4.57
Total for Forbs		241	187	965	884	118	90	409	383	8.13	8.54

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Herd unit 16A, Study no: 6

Type	Species	Strip Frequency		Average Cover %	
		'97	'02	'97	'02
B	Amelanchier alnifolia	4	3	.15	.38
B	Artemisia tridentata vaseyana	56	72	9.17	9.92
B	Chrysothamnus viscidiflorus viscidiflorus	10	16	.18	.34
B	Gutierrezia sarothrae	14	23	.07	1.24
B	Juniperus osteosperma	0	0	.85	.78
B	Purshia tridentata	22	19	2.97	2.51
B	Tetradymia canescens	3	9	.03	.48
Total for Browse		109	142	13.44	15.67

Key Browse Annual Leader Growth
Herd unit 16A , Study no: 6

Species	Average leader growth (in) '02
Artemisia tridentata vaseyana	2.1
Purshia tridentata	1.0

CANOPY COVER --
Herd unit 16A , Study no: 6

Species	Percent Cover '97	Percent Cover '02
Juniperus osteosperma	1.2	.20

Point-Quarter Tree Data

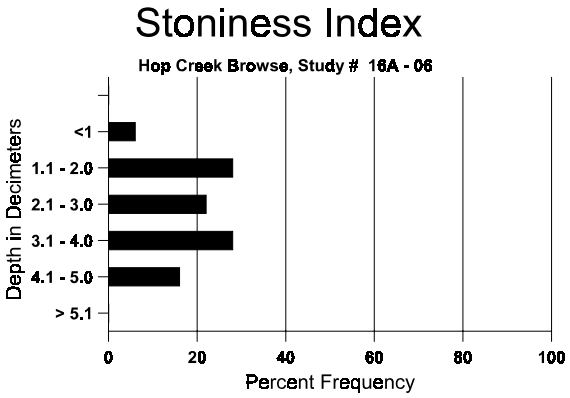
Trees per Acre '02	Average diameter (in) '02
24	8.5

BASIC COVER --
Herd unit 16A, Study no: 6

Cover Type	Nested Frequency '97	Nested Frequency '02	Average Cover % '83	Average Cover % '89	Average Cover % '97	Average Cover % '02
Vegetation	379	361	4.75	11.75	44.00	43.48
Rock	31	38	.25	.25	.19	.15
Pavement	154	150	.50	0	1.93	1.25
Litter	399	386	71.25	69.75	51.30	51.80
Cryptogams	111	72	1.25	1.50	4.62	2.62
Bare Ground	235	235	22.00	16.75	17.71	17.85

SOIL ANALYSIS DATA --
Herd Unit 16A, Study no: 06, Hop Creek Browse

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
20.2	44.0 (17.6)	6.9	42.4	27.1	30.6	3.2	9.6	67.2	.6



PELLET GROUP FREQUENCY --
Herd unit 16A, Study no: 6

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'97	'02	'02	'02
Rabbit	4	18	-	-
Elk	24	17	296	23 (56)
Deer	34	43	1897	146 (360)
Cattle	-	1	26	2 (5)

BROWSE CHARACTERISTICS --
Herd unit 16A, Study no: 6

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier alnifolia																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	-	3	-	-	-	-	-	-	-	3	-	-	-	60	30	31	3
	02	-	-	-	1	1	1	-	-	-	3	-	-	-	60	31	32	3
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	1	-	-	-	-	-	-	-	-	-	-	1	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	80%	00%	20%	-40%
'02	33%	33%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:
	'83	0	0%
	'89	0	0%
	'97	100	20%
	'02	60	0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	83	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	83	9	1	-	-	-	-	-	-	-	10	-	-	-	666			10
	89	8	-	-	2	-	-	-	-	-	10	-	-	-	666			10
	97	38	-	-	-	-	-	-	-	-	38	-	-	-	760			38
	02	51	-	-	-	-	-	-	-	-	48	3	-	-	1020			51
M	83	29	2	-	-	-	-	-	-	-	31	-	-	-	2066	31	36	31
	89	11	4	1	-	-	-	-	-	-	13	2	1	-	1066	29	33	16
	97	32	28	3	-	-	-	-	-	-	63	-	-	-	1260	33	45	63
	02	30	23	2	1	-	-	-	-	-	56	-	-	-	1120	30	39	56
D	83	4	2	-	-	-	-	-	-	-	5	1	-	-	400			6
	89	7	5	1	-	-	-	-	-	-	11	-	2	-	866			13
	97	7	5	2	-	-	-	-	-	-	4	1	-	9	300			15
	02	22	19	3	2	-	3	-	-	-	29	-	-	20	980			49
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	620			31
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	740			37

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	11%	00%	00%	-17%
'89	23%	05%	08%	-11%
'97	28%	04%	08%	+26%
'02	27%	05%	13%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	3132	Dec:	13%
	'89	2598		33%
	'97	2320		13%
	'02	3120		31%

Chrysothamnus nauseosus consimilis																		
Y	83	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	
'97	00%	00%	00%	
'02	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	66	Dec:	-
	'89	0		-
	'97	0		-
	'02	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus viscidiflorus																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	4	-	-	1	-	-	-	-	-	5	-	-	-	100			5
M	83	1	-	-	-	-	-	-	-	-	1	-	-	-	66	8	10	1
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66	10	14	1
	97	15	-	-	-	-	-	-	-	-	15	-	-	-	300	13	22	15
	02	23	-	1	4	-	-	-	-	-	28	-	-	-	560	11	18	28
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	4	-	-	-	-	-	-	-	-	1	-	-	3	80			4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+ 0%
'89	00%	00%	00%	+78%
'97	00%	00%	00%	+59%
'02	00%	03%	08%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:
	'83	66	0%
	'89	66	0%
	'97	300	0%
	'02	740	11%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	97	15	-	-	-	-	-	-	-	-	15	-	-	-	300			15
	02	5	-	-	-	-	-	-	-	-	4	1	-	-	100			5
M	83	1	-	-	-	-	-	-	-	-	1	-	-	-	66	11	19	1
	89	9	-	-	-	-	-	-	-	-	9	-	-	-	600	8	6	9
	97	25	-	-	-	-	-	-	-	-	25	-	-	-	500	7	7	25
	02	72	-	-	-	-	-	-	-	-	69	3	-	-	1440	6	11	72
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	97	2	-	-	-	-	-	-	-	-	-	-	-	2	40			2
	02	11	-	-	1	-	-	-	-	-	11	-	-	1	240			12
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	+92%
'89	00%	00%	00%	- 3%
'97	00%	00%	05%	+53%
'02	00%	00%	01%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'83	66	Dec:	0%
	'89	866		8%
	'97	840		5%
	'02	1780		13%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	02	-	1	1	-	-	-	-	-	-	2	-	-	-	40			2
M	83	-	-	6	-	-	-	-	-	-	1	-	5	-	400	44	38	6
	89	-	3	1	-	-	-	-	-	-	4	-	-	-	266	38	44	4
	97	4	3	14	-	-	3	-	-	-	23	-	-	1	480	38	54	24
	02	-	-	4	-	-	4	-	1	6	15	-	-	-	300	41	48	15
D	83	-	-	2	-	-	-	-	-	-	-	-	2	-	133			2
	89	-	-	2	-	-	-	-	-	-	2	-	-	-	133			2
	97	-	-	1	-	-	1	-	-	-	-	-	-	2	40			2
	02	-	-	1	-	-	5	-	-	1	6	-	-	1	140			7
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	140			7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	100%	88%	-25%
'89	50%	50%	00%	+26%
'97	15%	70%	11%	-11%
'02	04%	92%	04%	

Total Plants/Acre (excluding Dead & Seedlings)				
'83	533	Dec:		25%
'89	399			33%
'97	540			7%
'02	480			29%

Tetradymia canescens

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	02	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	97	4	-	-	-	-	-	-	-	-	4	-	-	-	80	14	11	4
	02	10	-	1	-	-	-	-	-	-	10	1	-	-	220	11	16	11

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'83	00%	00%	00%	
'89	00%	00%	00%	-40%
'97	00%	00%	00%	+69%
'02	00%	08%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'83	0	Dec:	-
'89	133		-
'97	80		-
'02	260		-